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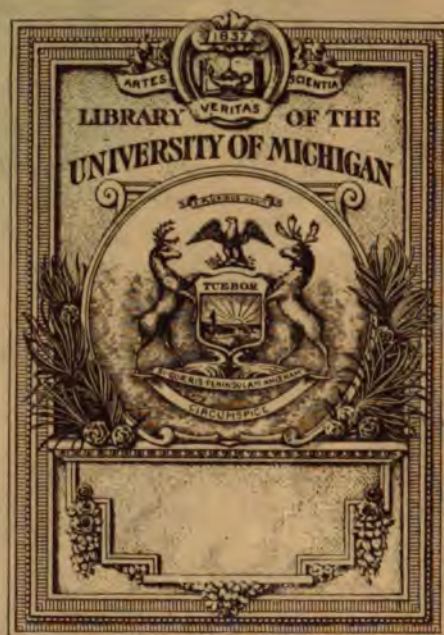
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U.S. Bureau of Census. The Sugar Industry, 1914.



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DEPARTMENT OF COMMERCE
U. S. BUREAU OF THE CENSUS
SAM. L. ROGERS, DIRECTOR

CENSUS OF MANUFACTURES
1914

THE SUGAR INDUSTRY

Prepared under the supervision of W. M. STEUART, Chief Statistician for Manufactures

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EXPLANATION OF TERMS.

Scope of census.—Census statistics of manufactures are compiled primarily for the purpose of showing the absolute and relative magnitude of the different branches of industry covered and their growth or decline. Incidentally, the effort is made to present data throwing light upon character of ownership, size of establishments, and similar subjects. When use is made of the statistics for these purposes it is imperative that due attention should be given to their limitations, particularly in connection with any attempt to derive from them figures purporting to show average wages, cost of production, or profits.

The census did not cover establishments which were idle during the entire year or whose products were valued at less than \$500, or the manufacturing done in educational, eleemosynary, and penal institutions.

Period covered.—The returns relate to the calendar year 1914, or the business year which corresponded most nearly to that calendar year, and cover a year's operations, except for establishments which began or discontinued business during the year.

The establishment.—As a rule, the term "establishment" represents a single plant or factory, but in some cases it represents two or more plants which were operated under a common ownership or for which one set of books of account was kept. If, however, the plants constituting an establishment as thus defined were not all located within the same city or state, separate reports were secured in order that the figures for each plant might be included in the statistics for the city or state in which it was located.

Influence of increased prices.—In comparing figures for cost of materials, value of products, and value added by manufacture in 1914 and 1909 with the corresponding figures for earlier censuses, account should be taken of the general increase in the prices of commodities during recent years. To the extent to which this factor has been influential the figures fail to afford an exact measure of the increase in the volume of business.

Persons engaged in the industry.—The following general classes of persons engaged in the industry distinguished: (1) Proprietors and firm members, (2) salaried officers of corporations, (3) superintendents and managers, (4) clerks (including other subordinate salaried employees), and (5) wage earners. In the reports for the censuses of 1904 and 1899 these five classes were shown according to the three main groups: (1) Proprietors and firm members, (2) salaried officials, clerks, etc., and (3) wage earners. In comparative tables covering the census of 1904 it is of course necessary to group the figures according to the classification that was employed at the earlier censuses.

The number of persons engaged in the industry, distributed by sex, and, in the case of wage earners, also by age (whether under 16 or 16 and over), was reported for a single representative day. The 15th of December was selected as representing for most establishments normal conditions of employment, but where this date was not a representative day an earlier date was chosen.

In the case of employees other than wage earners the number thus reported for the representative date has been treated as equivalent to the average for the year, since the number of employees of this class does not ordinarily vary much from month to month. In the case of wage earners the average has been obtained in the manner explained in the next paragraph.

In addition to the more detailed report by sex and age of the number of wage earners on the representative date, a report was obtained of the number employed on the 15th of each month, without distinction of sex or age. From these figures the average number of wage earners for the year has been calculated by dividing the sum of the numbers reported for the several months by 12. The average thus obtained approximates the number of wage earners that would be required to perform the work done if all were constantly employed during the entire year. Accordingly, the importance of the industry as an employer of labor is believed to be more accurately measured by this average than by the number employed at any one time or on a given day.

In order to determine as nearly as possible the sex and age distribution of the average number of wage earners for the industry as a whole, the per cent distribution by sex and age of the wage earners reported for December 15, or the nearest representative day, has been calculated from the actual number reported for that date, the percentages thus obtained have been applied to the average number of wage earners for the year in the industry to determine the average number of men, women, and children employed.

Salaries and wages.—Under these heads are given the total payments during the year for salaries and wages, respectively. The Census Bureau has not undertaken to calculate the average annual earnings of either salaried employees or wage earners. Such averages would possess little real value, because they would be based on the earnings of employees of both sexes, of all ages, and of widely varying degrees of skill. Furthermore, so far as wage earners are concerned, it would be impossible to calculate accurately even so

simple an average as this, since the number of wage earners fluctuates from month to month. The Census Bureau's figures for wage earners, as already explained, are averages based on the number employed on the 15th of each month and represent the approximate number who would be required to perform the work if all were continuously employed during the year, whereas the actual number to whom the total wages were paid would be larger.

Prevailing hours of labor.—No attempt was made to ascertain the number of wage earners working a given number of hours per week. The inquiry called merely for the prevailing practice followed in each establishment. Occasional variations in hours in an establishment from one part of the year to another were disregarded, and no attention was paid to the fact that a limited number of wage earners might have hours differing from those of the majority. All the wage earners of each establishment are therefore counted in the class within which the establishment itself falls. In most establishments, however, all or practically all the wage earners work the same number of hours, so that the figures give a substantially correct representation of the hours of labor.

Capital.—The instructions on the schedule for securing data relating to capital were as follows:

The answer should show the total amount of capital, both owned and borrowed, on the last day of the business year reported. All the items of fixed and live capital may be taken at the amounts carried on the books. If land or buildings are rented that fact should be stated and no value given. If a part of the land or buildings is owned, the remainder being rented, that fact should be so stated and only the value of the owned property given. Do not include securities and loans representing investments in other enterprises.

These instructions were identical with those employed at the census of 1909. The data compiled in respect to capital, however, at both censuses, as well as at all preceding censuses of manufactures, have been so defective as to be of little value except as indicating very general conditions. In fact, it has been repeatedly recommended by the census authorities that this inquiry be omitted from the schedule. While there are some establishments whose accounting systems are such that an accurate return for capital could be made, this is not true of the great majority, and the figures therefore do not show the actual amount of capital invested.

Materials.—The statistics as to cost of materials relate to the materials used during the year, which may be more or less than the materials purchased during the year. The term "materials" covers fuel, rent of power and heat, mill supplies, and containers, as well as materials which form a constituent part of the product.

Rent and taxes.—The taxes include internal revenue, corporation income tax, and state, county, and local taxes. In some instances the amount of the corporation tax for 1914 had not been ascertained when the report was prepared and the amount paid for 1913 was given.

Value of products.—The amounts given under this heading represent the selling value or price at the factory of all products manufactured during the year, which may differ from the value of the products sold.

Value added by manufacture.—The value of products is not a satisfactory measure of either the absolute or the relative importance of a given industry, because only a part of this value is actually created by the manufacturing processes carried on in the industry itself. Another part, and often by far the larger one, represents the value of the materials used. For many purposes, therefore, the best measure of the importance of an industry is the value created by the manufacturing operations carried on within the industry. This value is calculated by deducting the cost of the materials used from the value of the products. The figure thus obtained is termed in the census reports "value added by manufacture."

Cost of manufacture and profits.—The census data do not show the entire cost of manufacture, and consequently can not be used for the calculation of profits. No account has been taken of interest or depreciation, rent of offices and buildings other than factory or works, insurance, ordinary repairs, advertising, and other sundry expenses.

Primary horsepower.—This item represents the total primary power generated by the manufacturing establishments plus the amount of power, principally electric, rented from other concerns. It does not cover the power of electric motors taking their current from dynamos driven by primary power machines operated by the same establishment, because the inclusion of such power would obviously result in duplication. The figures for primary horsepower represent the rated capacity of the engines, motors, etc., and not the amount of power in actual daily use, since in most cases an engine or motor is not required to deliver continuously its full rated horsepower.

Fuel.—Statistics of the quantity of fuel used are shown only for anthracite and bituminous coal, coke, oil, and gas. They relate to the quantity used during the year, which may be more or less than the quantity purchased. As only the principal varieties of fuel are shown, no comparison can be made with the total cost of all fuel.

THE SUGAR INDUSTRY.

By JAMES D. BOYLE.

SUMMARY AND ANALYSIS.

Summary for the industry.—This report presents statistics for the manufacture of cane and beet sugar and for cane-sugar refining. Practically all the mills engaged in the manufacture of sugar from the cane are located in Louisiana. No reports were secured from the small plantation mills in that and adjoining states, and no statistics in regard to them are included. Data for mills of this character are collected and published in connection with the decennial census of agriculture. The products of these small mills are largely consumed in the neighborhood and consist almost entirely of sirup. The omission of data relating to them does not, therefore, appreciably affect the statistics for the production of cane sugar. A considerable portion of the output of the establishments in the cane-sugar branch of the industry is not refined at the mills but is sent to the refineries, where it is made ready for consumption.

The refining branch of the industry represents establishments engaged primarily in the refining of cane sugar. The larger part of the raw sugar used by re-

fineries is imported, but there is some duplication in the total cost of materials and value of products for the three branches of the industry as given in Table 1, due to the fact that the raw sugar reported as the product of the cane-sugar mills forms a part of the "materials" used by the refiners.

The establishments engaged in the industry are naturally located in the sections of the country in which the material can be obtained with the greatest advantage. Thus, the beet-sugar factories are in the states in which sugar beets are grown; the cane-sugar mills are largely concentrated in Louisiana, and the sugar refineries are located principally in or near New York City, Boston, Philadelphia, New Orleans, and San Francisco, where the imported raw sugar can be delivered most conveniently and economically.

Comparative summary, 1914 and 1909.—Table 1 summarizes the statistics of the sugar industry, as a whole, and of the three branches separately for 1914 and 1909, and gives percentages of increase.

Table 1	TOTAL.		BEET SUGAR.		CANE SUGAR.		SUGAR REFINING.		PER CENT OF INCREASE, ¹ 1909-1914.			
	1914	1909	1914	1909	1914	1909	1914	1909	Total.	Beet.	Cane.	Re- fined.
Number of establishments.....	259	291	60	58	181	214	18	19	-11.0	.....	-15.4	.....
Persons engaged.....	26,739	24,047	9,634	8,389	4,544	5,313	12,561	10,345	11.2	14.8	-14.5	21.4
Proprietors and firm members.....	181	205	1	1	172	198	8	6	-11.7	.....	-13.1	.....
Salaried employees.....	3,676	3,112	1,636	1,184	740	968	1,300	940	18.1	36.2	-25.1	38.3
Wage earners (average number).....	22,882	20,730	7,997	7,204	3,632	4,127	11,253	9,399	10.4	11.0	-12.0	19.7
Primary horsepower.....	239,617	217,805	70,705	57,202	113,246	122,189	49,666	38,414	10.0	24.1	-7.3	29.3
Capital.....	\$315,677,669	\$282,795,499	\$142,181,326	\$129,628,938	\$32,990,524	\$37,925,770	\$140,499,819	\$115,240,791	11.6	9.7	-13.0	21.9
Salaries and wages.....	\$21,242,971	\$18,453,198	\$8,864,853	\$8,577,900	\$2,652,521	\$2,600,172	\$10,326,597	\$7,275,126	29.1	34.8	-21.1	41.9
Salaries.....	\$5,252,014	\$4,161,030	\$2,258,649	\$1,769,454	\$491,145	\$737,421	\$2,502,220	\$1,654,155	26.2	27.6	-33.4	51.3
Wages.....	\$15,990,957	\$12,292,168	\$6,606,204	\$4,808,446	\$1,561,376	\$1,862,751	\$7,824,377	\$5,620,971	30.1	37.4	-16.2	39.2
Paid for contract work.....	\$279,915	\$44,669	\$247,657	\$1,591	\$11,968	\$43,068	\$20,270	.....	.....	.....	.....	.....
Rent and taxes (including internal revenue).....	\$2,014,111	\$1,520,143	\$807,223	\$634,111	\$263,620	\$315,631	\$943,058	\$570,401	32.5	27.3	-16.4	65.3
Cost of materials.....	\$321,442,937	\$274,847,974	\$41,399,361	\$27,265,170	\$15,953,218	\$21,294,844	\$264,065,358	\$226,287,960	17.0	51.8	-25.1	16.7
Value of products.....	\$373,639,298	\$327,371,780	\$62,606,210	\$48,122,383	\$21,635,373	\$30,620,738	\$289,398,715	\$248,628,669	14.1	30.1	-29.3	16.4
Value added by manufacture (value of products less cost of materials).....	\$52,196,361	\$52,523,806	\$21,206,849	\$20,857,213	\$5,677,155	\$9,325,894	\$25,313,357	\$22,340,699	-0.6	1.7	-39.1	13.3
Sugar:												
Tons (2,000 pounds).....	4,341,408	(²)	743,473	501,682	264,801	326,858	3,333,134	(²)	.....	48.2	-19.0	.....
Value.....	\$363,034,123	(²)	\$58,590,466	\$45,937,629	\$18,947,983	\$26,096,673	\$256,496,974	(²)	.....	27.5	-27.4	.....

¹ A minus sign (-) denotes decrease.

² The quantity and value for sugar refining were not reported for 1909, therefore the total can not be given.

During the period 1909-1914 the number of establishments engaged in the production of cane sugar decreased by about 15 per cent, but only slight changes took place in the number of establishments in the other two branches of the industry.

The total number of persons engaged in the three branches in 1914 was 26,739, representing an increase of 11.2 per cent as compared with the number in 1909.

Of this total, 36 per cent were reported by the beet-sugar factories, 17 per cent by the cane mills, and 47 per cent by the refineries, as against 35 per cent, 22 per cent, and 43 per cent, respectively, in 1909. Of the number of persons engaged in the industry as a whole in 1914, 3.9 per cent were proprietors and officials, 10.5 per cent were clerks or other subordinate

salaries employees, and 85.6 per cent were wage

earners. The great majority—25,850, or 96.7 per cent of the total—were males.

The manufacture of beet and cane sugar being seasonal in character, a considerably greater number of wage earners are employed during certain months than during others. For the industry as a whole, the maximum employment in 1914 (43,438) occurred in November; for the beet-sugar branch (20,353) in October; for the manufacture of cane sugar (14,635) in November; and for sugar refining (12,792) in June.

The total primary horsepower reported for the combined industry increased by 10 per cent between 1909 and 1914. Marked gains are shown for each branch of the industry except the manufacture of cane sugar.

The total value of products for the combined industry increased by 14.1 per cent during the five-year period covered by the table. This increase was confined to the beet-sugar and sugar-refining branches, the value of the output of cane sugar having declined by 29.3 per cent during this period. The increase for beet sugar was greater relatively but less in actual amount than that for sugar refining.

Of the total output of sugar in 1914, the refineries produced 76.8 per cent of the quantity and 78.6 per cent of the value; the beet-sugar factories, 17.1 per cent and 16.2 per cent, respectively; and the cane-

sugar mills, 6.1 per cent and 5.2 per cent, respectively. As already explained, these figures include some duplications, due to the use of a portion of the products of the cane-sugar mills as materials for the refineries.

The world's production of sugar during the year 1914 amounted to 41,972,098,560 pounds, of which 19,810,830,520 pounds, or 47.2 per cent, represented beet sugar. Of the world's production, 20.7 per cent was manufactured in continental United States.¹

Imports and exports of sugar.¹—During the fiscal year ended June 30, 1914, the United States imported 2,367,708 pounds of beet sugar, valued at \$70,829, and 4,944,815,410 pounds of cane sugar, valued at \$98,811,960. In addition, there were brought from Porto Rico 641,252,527 pounds of sugar, from Hawaii 1,114,750,702 pounds, and from the Philippine Islands 116,749,211 pounds, or a total of 1,872,752,440 pounds. During the same year there were exported 50,895,726 pounds of refined domestic sugar, valued at \$1,839,983, 724,570 pounds of foreign beet sugar valued at \$21,034, and 20,255,122 pounds of foreign cane sugar, valued at \$464,119. In addition there were shipped to Hawaii 1,593,670 pounds of refined sugar, to Porto Rico 16,855,067 pounds, and to Alaska 6,171,752 pounds. More than 95 per cent of the imported raw sugar comes from Cuba and 25,371,574 pounds of the Hawaiian shipment was refined sugar.

BEET-SUGAR INDUSTRY.

Comparative summary.—Table 2 summarizes the statistics of the manufacture of beet sugar in the United States, as reported at the censuses of 1914, 1909, and 1904, and gives separate figures for 1914 and 1909 with reference to three groups of states. It is impossible to publish statistics for the industry by states without disclosing the operations of individual establishments. For this reason, and also to permit a more detailed presentation of the statistics, the states have been arranged in three groups. By this means not only have disclosures of individual operations been avoided, but factories operated to a greater or less extent under similar conditions have been brought under the same heading. For the most part, in the states in Groups I and II—comprising California, Colorado, Idaho, Kansas, Montana, Nebraska, and Utah—the growers depend upon irrigation, and as a rule planting and harvesting are earlier in these states than in those constituting Group III—Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, and Wisconsin—in which the beets are grown on nonirrigated land.

For both 1914 and 1909, in certain cases two or more factories located in the same state and operated by the same company were covered by a single report. The data thus obtained were tabulated as pertaining to a single establishment. The number of separate factories reported as in operation in each year was 65.

The manufacture of beet sugar is an industry of comparative recent development in the United States. At the census of 1869 two establishments with products valued at \$119,720 were reported under the heading "sugar and molasses, beet and grape," the greater part of their output being beet sugar. For 1879, the first year for which the manufacture of beet sugar was shown separately, four establishments returned products to the value of \$282,572. For 1889 only two establishments were reported, and therefore no statistics could be published without disclosing the operations of individual concerns. During the next decade this branch of the sugar industry increased rapidly, and 30 establishments, with products valued at \$7,323,857, were reported at the census of 1899. Still greater development is shown for the next decade—58 establishments having been reported for 1909, with products valued at \$48,122,383, representing an increase of 557.1 per cent during the ten years. For the period 1909–1914 the increase amounted to \$14,482,827, or 30.1 per cent. The products of this branch of the industry consisted almost entirely of sugar, the subsidiary products, molasses and beet pulp, being of relatively little importance.

During the five-year period 1909 to 1914 the quantity of beets used increased by 42.2 per cent, and the quantity of sugar manufactured, by 48.2 per cent.

¹ Statistical Abstract, Bureau of Foreign and Domestic Commerce, and Commerce and Navigation of the United States, 1914.

Table 3

Table 2	BEET SUGAR.									PER CENT OF INCREASE. ¹						
	United States.			Group I. ²		Group II. ³		Group III. ⁴		United States.			Grp. I.	Grp. II.	Grp. III.	
	1914	1909	1904	1914	1909	1914	1909	1914	1909	1904-1914	1909-1914	1904-1909	1909-1914	1904-1909	1909-1914	
	1914	1909	1904	1914	1909	1914	1909	1914	1909	1914	1909	1904	1909	1904	1909	
Number of establishments ⁵ ..	60	58	51	12	12	28	26	20	20	17.6	3.4	13.7	.....	7.7	.....	
Persons engaged.....	9,634	8,389	4,726	2,366	2,173	4,660	3,888	2,608	2,328	103.9	14.8	77.5	8.9	19.9	12.0	
Proprietors and firm members.....	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Salaried employees.....	1,636	1,184	763	357	265	667	493	612	426	114.4	38.2	55.2	34.7	35.3	43.7	
Wage earners (average number).....	7,997	7,204	3,963	2,009	1,908	3,992	3,395	1,996	1,901	101.8	11.0	81.8	5.3	17.6	5.0	
Primary horsepower.....	76,705	57,202	35,490	22,983	13,551	34,281	30,149	19,556	13,502	116.1	34.1	61.2	68.8	13.7	44.8	
Capital.....	\$142,181,326	\$129,628,938	\$55,922,459	\$37,819,183	\$37,629,771	\$67,286,099	\$64,236,216	\$37,066,099	\$27,762,961	154.2	9.7	131.8	0.5	4.8	32.5	
Salaries and wages.....	\$8,894,588	\$6,577,900	\$3,491,338	\$2,236,443	\$1,750,621	\$4,532,379	\$3,115,733	\$3,046,031	\$1,711,516	163.9	24.8	85.4	27.8	47.1	19.5	
Salaries.....	\$2,285,649	\$1,768,454	\$1,004,630	\$561,239	\$453,666	\$1,020,577	\$769,307	\$876,833	\$546,481	124.8	27.6	76.1	23.7	32.7	23.8	
Wages.....	\$6,608,939	\$4,809,446	\$2,486,702	\$1,675,204	\$1,296,955	\$3,511,802	\$2,346,426	\$2,169,198	\$1,165,035	165.7	37.4	93.4	29.2	51.8	17.6	
Paid for contract work.....	\$247,657	\$1,591	\$13,265	\$6,167	.....	\$200,537	.....	.....	\$1,591	.....	.....	.....	.....	.....	.....	
Rent and taxes (including internal revenue).....	\$807,223	\$634,111	\$243,443	\$300,681	\$122,628	\$337,620	\$364,417	\$178,963	\$147,066	231.6	27.3	160.5	137.0	-7.4	21.7	
Cost of materials.....	\$41,899,361	\$27,265,170	\$14,486,876	\$10,065,289	\$5,195,751	\$22,867,679	\$13,241,895	\$8,466,368	\$7,824,524	185.8	51.8	88.2	62.4	72.7	8.2	
Value of products.....	\$62,605,210	\$48,122,353	\$24,393,794	\$15,528,666	\$12,496,379	\$32,118,424	\$22,651,908	\$14,963,120	\$12,971,201	156.6	30.1	97.3	24.2	41.8	15.4	
Value added by manufacture (value of products less cost of materials).....	\$21,205,840	\$30,857,212	\$9,906,918	\$5,463,377	\$5,300,528	\$9,245,745	\$9,410,008	\$6,496,737	\$5,146,677	114.1	1.7	110.5	-13.3	-1.8	26.2	
Beets used (tons 2,000 pounds).....	5,639,103	3,965,356	2,175,417	1,138,264	901,855	3,276,230	2,036,437	1,224,609	1,027,064	159.2	42.2	82.3	26.2	60.9	19.2	
Sugar produced:																
Tons (2,000 pounds).....	743,473	501,682	253,921	176,431	131,605	414,954	241,337	152,088	128,744	192.8	48.2	97.6	34.1	71.9	18.1	
Value.....	\$58,590,466	\$45,937,639	\$23,924,602	\$14,244,035	\$12,216,616	\$30,744,567	\$21,631,709	\$13,501,864	\$12,089,304	144.9	27.5	92.0	17.4	42.1	11.7	

¹ A minus sign (-) denotes decrease.² Group I embraces: California, 12 establishments in 1914; and Arizona 1, California 9, Oregon 1, and Washington 1, in 1909.³ Group II embraces: Colorado 12 establishments, Idaho 4, Kansas 1, Montana 1, Nebraska 2, and Utah 7, in 1914; and Colorado 15, Idaho 3, Kansas 1, Montana 1, Nebraska 1, and Utah 5, in 1909.⁴ Group III embraces: Illinois 1 establishment, Indiana 1, Iowa 1, Michigan 10, Minnesota 1, Ohio 3, and Wisconsin 3, in 1914; and Illinois 1, Iowa 1, Michigan 11, Minnesota 1, New York 1, Ohio 1, and Wisconsin 4, in 1909.⁵ The number of separate factories in operation in both 1914 and 1909 was 65. In each year, however, in some cases, two or more factories operated in the same state by one owner were reported as one establishment.

While increases are shown for the industry in all three groups of states, by far the greatest development is shown for Group II, which comprises four of the mountain states and Kansas and Nebraska. For 1914 the factories in this group reported 48.4 per cent of the total number of persons engaged in the industry, and 55.8 per cent and 52.5 per cent, respectively, of the total quantity and value of sugar manufactured.

Capacity of establishments.—The growth of the industry is further illustrated by Table 3, which shows, for 1914, 1909, and 1904, the total number of factories in each state and their total daily slicing capacity.

Table 3

STATE.	BEET SUGAR.					
	1914 ¹		1909 ²		1904 ³	
	Number of factories.	Daily capacity (tons of beets).	Number of factories.	Daily capacity (tons of beets).	Number of factories.	Daily capacity (tons of beets).
United States.....	77	68,875	68	52,750	51	35,900
Arizona.....	1	600	1	800	.....	.....
California.....	13	12,925	11	11,700	5	7,300
Colorado.....	17	17,900	16	12,200	9	6,350
Idaho.....	5	3,650	4	3,750	3	1,800
Illinois.....	1	450	1	350	.....	.....
Indiana.....	1	800	.....	.....	.....	.....
Iowa.....	1	500	1	500	.....	.....
Kansas.....	1	900	1	1,200	.....	.....
Michigan.....	16	14,550	17	11,900	19	12,550
Minnesota.....	1	800	1	600	1	400
Montana.....	1	1,950	1	1,200	.....	.....
Nebraska.....	2	1,900	1	350	3	1,200
Nevada.....	1	600	.....	.....	.....	.....
New York.....	.....	.....	1	600	1	600
Ohio.....	5	3,500	1	400	1	400
Oregon.....	.....	.....	1	400	1	350
Utah.....	7	5,050	5	4,000	4	2,850
Washington.....	1	.....	1	800	1	400
Wisconsin.....	4	2,800	4	2,300	3	1,700

¹ Willett and Gray's Weekly Statistical Sugar Trade Journal.² The American Sugar Industry and Beet Sugar Gazette, January, 1910.³ Includes 11 idle factories and 1 run for cane experimentation.⁴ Includes 3 idle factories.⁵ Includes 1 idle factory.

During the decade 1904-1914 the total daily slicing capacity of the beet-sugar factories increased by 91.9 per cent. Based on the capacity reported for 1914, the leading three states in the manufacture of beet sugar are Colorado, Michigan, and California, in the order in which named. These states reported a combined slicing capacity equal to 65.9 per cent of the total for the United States.

Persons engaged in the industry.—Table 4 shows, for 1914 and 1909, the number of persons engaged in the beet-sugar branch of the industry, distributed by sex, the average number of wage earners being distributed also by age. The sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the "Explanation of terms."

Table 4

CLASS.	Census year.	PERSONS ENGAGED IN THE BEET-SUGAR INDUSTRY.				
		Total.	Male.	Female.	Per cent of total.	
					Male.	Female.
All classes.....	1914 1909	9,634 8,389	9,458 8,281	176 108	98.2 98.7	1.8 1.3
Proprietors and officials.....	1914 1909	377 320	377 320	.....	100.0 100.0	.....
Proprietors and firm members.....	1914 1909	1 1	1 1	.....	100.0 100.0	.....
Salaried officers of corporations.....	1914 1909	98 91	98 91	.....	100.0 100.0	.....
Superintendents and managers.....	1914 1909	278 228	278 228	.....	100.0 100.0	.....
Clerks and other subordinate salaried employees.....	1914 1909	1,121 865	1,121 772	139 93	89.0 89.2	11.0 10.8
Wage earners (average number).....	1914 1909	7,997 7,204	7,997 7,199	37 15	99.5 99.8	0.5 0.2
16 years of age and over.....	1914 1909	7,998 7,198	7,998 7,183	37 15	99.5 99.8	0.5 0.2
Under 16 years of age.....	1914 1909	2 6	2 6	.....	100.0 100.0	.....

The average number of persons engaged in the beet-sugar industry increased by 1,245, or 14.8 per cent, between 1909 and 1914. Of the total for 1914, 3.9 per cent were proprietors and officials, 13.1 per cent were clerks and other subordinate salaried employees, and 83 per cent were wage earners. The corresponding percentages for 1909 were 3.8, 10.3, and 85.9. Of the few females employed, the great majority were in the clerical class. Of the total number of wage earners but 2 were under 16 years of age in 1914, as against 6 in 1909.

Wage earners employed, by months.—Table 5 gives the number of wage earners employed in the manufacture of beet sugar on the 15th, or nearest representative day, of each month during the years 1914 and 1909.

MONTH.	WAGE EARNERS IN THE BEET-SUGAR INDUSTRY.			
	Number.		Per cent of maximum.	
	1914	1909	1914	1909
January.....	6,593	6,466	32.4	38.5
February.....	2,527	2,206	12.4	13.1
March.....	2,537	2,750	12.5	14.4
April.....	3,164	3,067	15.5	15.2
May.....	3,980	3,432	19.6	20.4
June.....	4,045	3,943	19.9	20.5
July.....	4,470	4,506	22.0	22.8
August.....	7,180	6,045	35.3	30.0
September.....	9,066	7,215	44.5	42.9
October.....	20,353	15,815	100.0	84.1
November.....	15,686	16,807	91.8	100.0
December.....	13,354	14,283	65.6	84.7

The active period in the beet-sugar branch of the industry—termed the “campaign”—begins in August in California, but in the other states it does not com-

mence until October and covers the last three months of the year. During this period the factories are, as a rule, operated continuously. The maximum number of wage earners in 1914 were employed during October and in 1909 during November. The minimum number in both years was reported for February and represented about one-eighth of the maximum.

Power.—The increase in primary horsepower between 1909 and 1914 amounted to 19,503, or 34.1 per cent. (See Table 1.) The use of rented power has materially increased since 1909, for which year 2,090 horsepower of this character, representing 3.7 per cent of the total primary power, was reported. In 1914 the amount of such power had increased to 5,075 horsepower, or 6.6 per cent of the total, the percentage of increase being 142.8. The use of electric motors run by current generated in the same establishment has also increased greatly. For 1914, 12,796 horsepower of this character was reported, as against 6,778 for 1909, the rate of increase being 88.8 per cent.

Fuel.—Closely related to the subject of power is that of fuel. The total cost of fuel and rented power in 1914, as shown by Table 8, was \$2,726,525. The fuel consumed included 757,782 tons of coal and coke and 803,698 barrels of oil (including gasoline), almost the entire quantity of the latter being reported from California.

Materials and products.—Table 6 shows, for 1914, 1909, and 1904, the acreage, quantity, and quality of beets treated for the manufacture of sugar. Separate figures are also given, for 1904 and 1909, with reference to the three groups of states defined in the footnotes in Table 2.

Table 6

Table 6	BEET SUGAR.								
	United States.			Group I.		Group II.		Group III.	
	1914	1909	1904	1914	1909	1914	1909	1914	1909
Total acreage of beets planted.....	532,421	415,964	240,757	118,126	96,094	276,631	198,816	127,364	131,054
By proprietors.....	28,266	20,459	20,484	23,903	21,511	4,101	6,609	263	1,249
By tenants.....	15,397	18,166	20,223	11,874	10,362	3,528	7,804		
By independent growers.....	488,758	368,339	200,050	82,349	64,221	269,007	184,313	127,102	129,805
Total quantity of beets treated (tons of 2,000 pounds).....	5,639,108	3,965,356	2,175,417	1,138,264	901,855	3,276,230	2,086,437	1,224,609	1,027,064
Grown by proprietors.....	214,923	266,768	169,539	172,704	206,858	40,212	52,158	2,007	7,753
Grown by tenants.....	135,537	163,843	210,247	98,468	101,885	37,089	61,958		
Grown by independent growers.....	5,288,643	3,534,745	1,795,631	867,092	593,112	2,198,949	1,922,321	1,222,602	1,019,312
Quality of beets used:									
Average percentage of sucrose.....	16.1	16.1	15.0	18.2	18.0	15.7	15.1	15.4	16.6
Average coefficient of purity.....	84.0	84.1	83.2	83.0	84.8	84.2	83.1	84.2	85.8

The acreage of beets planted for factory use in the United States increased by 121.1 per cent during the ten-year period 1904–1914. Of the acreage in 1914, 5.3 per cent was planted directly by the factories, 2.9 per cent by tenants of factory owners, and 91.8 per cent by independent growers. Of the total quantity of beets treated during the same year, 3.8 per cent was grown directly by the companies, 2.4 per cent by tenants, and 93.8 per cent by independent growers.

In order to assure a proper supply of beets for the operation of their factories, some manufacturers purchase or lease farm land and either cultivate it themselves or sublet it for beet growing. The proportion of the total acreage of sugar beets controlled by the manufacturers has decreased considerably since 1904, and during the period 1909–1914 there was not only a relative but an actual decrease in the acreage thus controlled.

The average yield of beets per acre for the entire United States increased from 9.5 tons in 1909 to 10.6 tons in 1914. The highest average per acre in the later year, 11.8, was reported from the states in Group II, and the lowest, 8.9, from those in Group III. In each of the three groups there were increases in both acreage and quantity of beets grown; and in Groups II and III there were increases in the yield per acre, but in Group I the yield per acre decreased.

The quality of the sugar beet is indicated by the "percentage of sucrose" and the "coefficient of purity." Both these terms relate to the sugar content, the former representing the ratio between the weight of the sugar and that of the whole beet, and the latter the ratio between the weight of the sugar and that of the solid content of the beet. In the operation of beet-sugar factories the coefficient of purity of the beets used is of great importance, as upon this depends to a considerable extent the cost of the separation of the sugar from the other solids.

For the United States as a whole, increases are shown for the period 1904-1909 in both the average percentage of sucrose and the average coefficient of purity, but during the following five-year period there was substantially no change. For 1914 the establishments in Group I reported the highest percentage of sucrose but the lowest coefficient of purity. There

was little difference in the quality of the beets as reported by the establishments in Groups II and III for the same year. The total sugar content of the 5,639,103 tons of beets used in 1914, based on the average of 16.1 per cent, was 907,896 tons; but the quantity of sugar manufactured, according to the returns, was only 743,473 tons, or 81.9 per cent of the theoretically possible total. This percentage, however, is higher than the corresponding one for 1909—78.6—from which it will be seen that the actual sugar loss was appreciably less in the later year than in the earlier, probably because of improvements in the processes of manufacture.

Methods of payment for beets purchased.—Two methods are employed in determining the price to be paid for the beets purchased by the sugar factories. One is the payment of a fixed price per ton, with a proviso, in some instances, that the beets must average not less than a certain percentage of sucrose. The other is the sliding scale, where a stipulated price is paid for beets analyzing a specified percentage of sucrose, with an added amount for every additional per cent or a fraction of a per cent of sucrose.

Table 7 shows the quantity and value of the various products manufactured in the United States in 1914, 1909, and 1904, and in the three groups of states separately in 1914 and 1909.

PRODUCT.	BEET SUGAR.								
	United States.			Group I.		Group II.		Group III.	
	1914	1909	1904	1914	1909	1914	1909	1914	1909
Total value.....	\$62,605,210	\$48,122,383	\$24,398,704	\$15,528,666	\$12,400,279	\$32,113,424	\$22,651,908	\$14,968,120	\$12,971,201
Sugar:									
Tons (2,000 pounds).....	743,473	501,682	253,922	176,431	131,605	414,954	241,832	152,086	128,745
Value.....	\$58,590,466	\$45,967,629	\$23,924,002	\$14,844,035	\$12,216,616	\$30,744,567	\$21,631,709	\$12,501,864	\$12,089,364
Granulated—									
Tons.....	739,233	496,807	248,309	175,555	131,218	412,019	237,640	151,656	127,949
Value.....	\$58,361,324	\$45,645,810	\$23,498,373	\$14,290,575	\$12,197,526	\$30,592,263	\$21,420,196	\$12,468,486	\$12,028,063
Raw—									
Tons.....	4,240	4,875	5,613	873	387	2,935	3,692	432	796
Value.....	\$239,142	\$320,819	\$431,229	\$68,460	\$19,090	\$152,804	\$211,513	\$33,375	\$61,216
Average pounds of sugar per ton of beets.	264	263	233	310	292	228	237	248	251
Molasses:									
Gallons.....	26,461,291	20,812,747	9,609,842	4,618,243	2,715,776	16,138,518	11,553,537	5,704,530	6,533,434
Value.....	\$1,536,192	\$1,129,905	\$221,097	\$260,327	\$95,790	\$864,206	\$658,130	\$411,669	\$450,965
Pulp, value.....	\$2,094,893	\$795,900	\$202,070	\$540,775	\$66,723	\$504,651	\$305,202	\$1,049,437	\$423,975
Dried, value.....	\$1,510,759	(1)	(1)	\$418,836	(1)	\$45,572	(1)	\$1,046,351	(1)
Moist, value.....	\$584,104	(1)	(1)	\$121,939	(1)	\$459,079	(1)	\$3,086	(1)
All other products, value.....	\$383,689	\$258,949	\$46,025	\$383,529	\$120,150	.....	\$131,862	\$100	\$6,987

1 Not reported separately.

Of the total production of beet sugar in the United States in 1914, the states of Group I reported 23.7 per cent; those of Group II, 55.8 per cent; and those of Group III, 20.5 per cent. The average quantity of sugar obtained per ton of beets in the United States appears to have increased during the decade covered by the table. Molasses and pulp, the most important subsidiary products of the industry, are used largely in the preparation of stock feed.

It is very desirable to secure beets containing a high a percentage of sucrose as possible, and to attain

this end the manufacturers are cooperating with the growers by directing their attention to improved methods of planting and cultivation.

The principal statistics for the manufacture of beet sugar during the year 1914 are presented, by groups of states, in Table 8.

With reference to the statistics of capital, attention is called to the probability that the returns relating to this item made by a number of establishments included the value of land used for the production of beets.

Table 5	BEET SUGAR.					BEET SUGAR.			
	United States.	Group I.	Group II.	Group III.		United States.	Group I.	Group II.	Group III.
Number of establishments.....	60	12	26	20	Contract work.....	\$247,657	\$6,167	\$200,587	\$40,968
Persons engaged in the industry.....	9,694	2,366	4,660	2,668	Rent and taxes.....	\$907,228	\$290,631	\$557,629	\$178,968
Proprietors and firm members.....	1		1		Rent of factory.....	\$70,000	\$70,000		
Salaried officers, superintendents, and managers.....	376	67	192	117	Taxes (including internal revenue).....	\$737,228	\$220,631	\$337,629	\$178,968
Clerks, etc.....	1,260	260	475	495	Cost of materials.....	\$41,369,361	\$10,065,299	\$22,867,679	\$8,436,383
Male.....	1,121	265	429	428	Principal materials.....	\$38,672,636	\$9,377,861	\$21,494,608	\$7,800,367
Female.....	139	25	47	67	Fuel and rent of power.....	\$3,726,625	\$687,428	\$1,373,071	\$66,026
Wage earners:					Value of products.....	\$62,605,210	\$15,628,666	\$32,113,424	\$14,963,120
Average number.....	7,997	2,009	3,992	1,996	Value added by manufacture.....	\$21,206,849	\$5,463,877	\$9,245,745	\$6,496,727
Number 15th day of month—maximum month and number.....	Oct., 20,353	Oct., 4,167	Oct., 9,328	Oct., 6,848	Power:				
Minimum month and number.....	Feb., 2,527	Feb., 794	Feb., 1,348	Feb., 398	Primary horsepower.....	76,705	22,868	34,281	19,556
Wage earners, Dec. 15, or nearest representative day.....	19,518	4,261	8,758	6,499	Steam engines and turbines.....	70,507	18,072	33,105	19,380
16 years of age and over.....	19,513	4,257	8,757	6,498	Internal-combustion engines.....	928	690	52	196
Male.....	19,423	4,226	8,727	6,470	Water wheels and motors.....	195		185	10
Female.....	90	31	30	29	Electric (rented).....	5,075	4,116	989	20
Under 16 years of age.....	5	4	1		Electric horsepower generated by establishments reporting.....	12,796	6,323	4,111	2,362
Male.....	5	4	1		Fuel:				
Female.....					Coal (tons of 2,000 pounds).....	719,928	15	474,345	245,568
Capital.....	\$142,181,326	\$37,819,188	\$67,296,099	\$37,066,099	Coke (tons of 2,000 pounds).....	87,854	8,790	20,980	8,064
Salaries and wages.....	\$9,864,853	\$2,226,443	\$4,583,379	\$2,046,031	Oil, including gasoline (barrels).....	808,698	764,684	38,812	202
Officials.....	\$1,073,215	\$290,433	\$584,753	\$248,029	Gas (1,000 cubic feet).....	4,789	4,789		
Clerks, etc.....	\$1,185,434	\$270,806	\$485,824	\$228,804					
Wage earners.....	\$6,606,204	\$1,675,204	\$3,561,802	\$1,369,198					

CANE-SUGAR INDUSTRY.

Magnitude of the industry.—At censuses prior to that of 1909 the data for the manufacture of cane sugar and for sugar refining were combined, for which reason the statistics for the earlier years are not comparable with those for 1909 or 1914. At the beginning of the section following relating to sugar refining, there is given, in text form, a brief summary of the earlier statistics as to wage earners and value of products of establishments engaged in sugar refining and in the manufacture of sugar and molasses.

The statistics for the manufacture of cane sugar are summarized in Table 1. It will be seen that during the period 1909–1914 more or less pronounced decreases took place in all the items covered by the table, that in value added by manufacture, 39.1 per cent, being relatively the greatest. The products of the cane-sugar mills in 1914 were valued at \$21,635,373 and represented 5.8 per cent of the total value of products for the entire sugar industry.

All but 10 of the establishments reported for 1909 and all but 13 of those for 1914 were located in Louisiana.

Persons engaged in the industry.—Table 9 shows, for 1914 and 1909, the number of persons engaged in the industry, distributed by sex, the average number of wage earners being distributed also by age. The sex and age classification of the average number of wage earners in this and other tables is an estimate obtained by the method described in the "Explanation of terms."

Of the total number of persons engaged in the industry in 1914, 9.9 per cent were proprietors and officials, 10.2 per cent were clerks and other subordinate salaried employees, and 79.9 per cent were wage earners. The corresponding percentages for 1909 were 11.1, 11.2, and 77.7. Only 121 females, or 2.7 per cent of the total, were reported for 1914. Of these, a

little more than two-thirds were wage earners. The number of female proprietors and officials declined greatly during the five-year period. The number of wage earners under 16 years of age nearly doubled between 1909 and 1914, and in the later year represented about 1 per cent of the total wage earners.

Table 9	CLASS.	Census year.	PERSONS ENGAGED IN THE CANE-SUGAR INDUSTRY.				
			Total.	Male.	Female.	Per cent of total.	
						Male.	Female.
	All classes.....	1914	4,544	4,423	121	97.3	2.7
		1909	5,313	5,213	100	98.1	1.9
	Proprietors and officials.....	1914	450	432	18	96.0	4.0
		1909	590	544	46	92.2	7.8
	Proprietors and firm members.....	1914	172	154	18	89.5	10.5
		1909	198	154	44	77.8	22.2
	Salaried officers of corporations.....	1914	72	72		100.0	
		1909	105	103	2	98.1	1.9
	Superintendents and managers.....	1914	206	206		100.0	
		1909	287	287		100.0	
	Clerks and other subordinate salaried employees.....	1914	462	442	20	95.7	4.3
		1909	596	567	29	95.1	4.9
	Wage earners (average number).....	1914	3,632	3,549	83	97.7	2.3
		1909	4,127	4,102	25	99.4	0.6
	16 years of age and over.....	1914	3,588	3,509	79	97.8	2.2
		1909	4,104	4,080	24	99.4	0.6
	Under 16 years of age.....	1914	44	40	4	90.9	9.1
		1909	23	22	1	95.7	4.3

Wage earners employed, by months.—Table 10 shows, for 1914 and 1909, the number of wage earners employed on the 15th, or nearest representative day, of each month, together with the percentage which the number reported for each month forms of the greatest number reported for any month of the same year.

Harvesting and crushing the cane usually begin in October, are at their height in November, and continue through December and to a limited extent into January. The maximum number of wage earners

was reported for November for both 1914 and 1909. The minimum employment occurred in March in the later year and in February in the earlier, and represented 4.6 per cent and 3.5 per cent, respectively, of the corresponding maximum.

Table 10

MONTH.	WAGE EARNERS IN THE CANE-SUGAR INDUSTRY.			
	Number.		Per cent of maximum.	
	1914	1909	1914	1909
January.....	1,453	1,598	9.9	10.1
February.....	893	559	6.1	3.5
March.....	673	715	4.6	4.5
April.....	701	798	4.8	5.1
May.....	723	874	4.9	5.5
June.....	857	1,040	5.9	6.6
July.....	1,062	1,122	7.3	7.1
August.....	1,017	920	6.9	5.8
September.....	1,338	1,322	9.1	8.4
October.....	7,253	9,693	49.6	61.5
November.....	14,635	15,761	100.0	100.0
December.....	12,979	15,115	88.7	95.9

It is necessary to crush the cane promptly after harvesting in order to prevent deterioration, and for this reason, as well as on account of the shortness of the season, most of the mills are operated continuously during the "campaign." A common practice is to have two sets of workmen alternate in shifts of six hours each. For 1914, 2,931 wage earners, or 80.7 per cent of the total, and for 1909, 3,920, or 95 per cent, were returned as working in establishments where the prevailing hours were 72 or more per week.

Character of ownership.—Table 11 presents statistics in respect to the character of ownership, or legal organization, of establishments in the cane-sugar branch of the industry, for 1914 and 1909.

Table 11

CHARACTER OF OWNERSHIP.	Census year.	CANE SUGAR.			
		Number of establishments.	Average number of wage earners.	Value of products.	Value added by manufacture.
All classes.....	1914 1909	181 214	3,632 4,127	\$21,635,373 30,620,738	\$5,677,155 9,325,894
Individuals.....	1914 1909	55 73	868 949	3,710,938 6,701,121	959,732 1,927,335
Corporations.....	1914 1909	91 98	2,237 2,568	15,080,209 19,360,776	4,068,096 6,068,217
All others.....	1914 1909	35 43	527 610	2,844,226 4,558,841	649,327 1,330,342
Per cent distribution:					
Individuals.....	1914 1909	30.4 34.1	23.9 23.0	17.2 21.9	16.9 20.7
Corporations.....	1914 1909	50.3 45.8	61.6 62.2	69.7 63.2	71.7 65.1
All others.....	1914 1909	19.3 20.1	14.5 14.8	13.1 14.9	11.4 14.3

The establishments operated by corporations in 1914, although representing only half the total number, reported 61.6 per cent of the average number of wage earners and 69.7 per cent of the value of products.

Statistics in detail.—Table 12 presents detailed statistics for establishments grouped according to the value of their products, for 1914 and 1909.

Table 12

	TOTAL FOR ALL ESTABLISHMENTS.		ESTABLISHMENTS WITH PRODUCTS VALUED AT—					
			Less than \$50,000.		\$50,000 to \$100,000.		\$100,000 and over.	
	1914	1909	1914	1909	1914	1909	1914	1909
Number of establishments.....	181	214	63	66	40	57	78	91
Persons engaged in the industry.....	4,544	5,313	534	627	925	936	3,085	3,750
Proprietors and firm members.....	172	198	82	74	38	51	52	73
Salaried officers, superintendents, and managers.....	278	392	39	68	72	107	167	217
Clerks and other subordinate salaried employees.....	462	596	59	61	48	93	355	442
Male.....	442	567	56	60	48	89	338	418
Female.....	20	29	3	1	.....	4	17	24
Wage earners—								
Average number.....	3,632	4,127	355	424	719	685	2,558	3,018
Number, 15th day of month—								
Maximum month and number.....	Nov. 14, 635	Nov. 15, 761	Nov. 1, 844	Nov. 2, 101	Nov. 2, 806	Nov. 2, 711	Nov. 9, 963	Nov. 10, 949
Minimum month and number.....	Mar. 673	Feb. 559	May 21	Feb. 12	Apr. 122	Feb. 30	Mar. 514	Feb. 517
Wage earners Dec. 15 or nearest representative day.....	15,054	15,369	2,170	2,063	2,802	2,730	10,082	10,587
16 years of age and over.....	14,873	15,283	2,156	2,032	2,757	2,708	9,980	10,548
Male.....	14,546	15,192	2,148	2,018	2,662	2,701	9,736	10,473
Female.....	327	91	8	14	95	7	224	70
Under 16 years of age.....	181	86	14	20	45	22	122	44
Male.....	165	83	14	20	30	22	121	41
Female.....	16	3	.....	.....	15	.....	1	3
Capital.....	\$32,996,524	\$37,925,770	\$3,180,014	\$3,907,869	\$5,355,433	\$6,712,393	\$24,461,077	\$27,305,508
Salaries and wages.....	\$2,052,521	\$2,600,172	\$161,381	\$200,876	\$328,167	\$419,006	\$1,562,973	\$1,980,291
Officials.....	\$361,603	\$523,598	\$16,994	\$33,001	\$60,924	\$100,525	\$283,685	\$390,073
Clerks.....	\$129,542	\$213,823	\$9,781	\$9,282	\$11,705	\$24,322	\$106,056	\$180,219
Wage earners.....	\$1,561,376	\$1,862,751	\$134,606	\$159,639	\$255,538	\$294,158	\$1,171,232	\$1,408,964
Contract work.....	\$11,988	\$43,068	\$100	\$11,501	\$310	\$18,928	\$11,578	\$12,642
Rent and taxes.....	\$263,820	\$315,631	\$26,222	\$27,434	\$45,142	\$63,532	\$192,456	\$224,665
Rent of factory.....	\$30,067	\$33,244	\$450	.....	.....	.....	\$29,637	\$33,244
Taxes (including internal revenue and corporation income).....	\$233,733	\$282,387	\$25,772	\$27,434	\$45,142	\$63,532	\$162,819	\$191,421
Cost of materials.....	\$15,958,218	\$21,294,844	\$1,118,563	\$1,444,671	\$2,304,586	\$3,203,218	\$12,535,069	\$16,646,955
Principal materials.....	\$14,806,608	\$19,860,463	\$1,003,941	\$1,288,469	\$2,067,654	\$2,926,671	\$11,715,013	\$15,645,323
Fuel and rent of power.....	\$1,151,610	\$1,434,381	\$114,622	\$156,202	\$216,932	\$276,547	\$820,056	\$1,001,632
Value of products.....	\$21,635,373	\$30,620,738	\$1,369,350	\$1,889,295	\$2,967,363	\$4,456,643	\$17,278,680	\$24,274,800
Value added by manufacture.....	\$5,677,155	\$9,325,894	\$250,787	\$444,624	\$682,777	\$1,253,426	\$4,743,591	\$7,627,845
Power:								
Primary horsepower.....	113,246	122,189	13,282	17,074	21,813	24,390	78,151	80,795
Steam engines and turbines.....	112,776	121,439	13,167	16,674	21,735	24,355	77,674	80,410
Internal-combustion engines.....	438	380	83	80	78	35	277	315
Electric (rented).....	32	370	32	370	.....	.....	.....	.....
Electric horsepower generated by establishments reporting.....	2,737	3,625	106	234	537	295	2,094	3,096

¹ Includes for 1914, Arizona, 1 establishment; Florida, 5; Louisiana, 168; Mississippi, 2; South Carolina, 1; and Texas, 4. For 1909, Illinois, 1 establishment; Louisiana, 204; Maryland, 1; Minnesota, 2; and Texas, 6.

The number of establishments reported for each of the three groups for which figures are given in the table decreased between 1909 and 1914, the greatest decrease, both absolutely and proportionally, being that shown for the second group. In each year the establishments with products valued at more than \$100,000, operated for the most part by corporations, represented about 43 per cent of the total number of establishments. These large establishments, however, reported 70.4 per cent of the total wage earners and 79.9 per cent of the total value of products for 1914, as against 73.1 per cent and 79.3 per cent, respectively, for 1909.

The output of one factory in 1909 was valued at more than \$1,000,000, but no establishment reported so great a value of products at the census of 1914.

Practically all the primary power used in this branch of the industry—99.6 per cent in 1914 and 99.4 per cent in 1909—is derived from steam. The use of rented electric power, reported only for the establishments in the first group, decreased by more than 90 per cent between the two census years.

The fuel consumed for the generation of power and for other purposes by the establishments engaged in the manufacture of cane sugar in 1914 included 32,898 tons of coal, 15 tons of coke, and 840,179 barrels of oil and gasoline. In addition, large quantities of the pulp of the sugar cane, from which the juice had been extracted, was used for fuel.

Materials used.—Table 13 presents statistics concerning the quantity and cost of cane crushed and the cost of other materials for 1914 and 1909.

Of the total quantity of cane crushed, 40.8 per cent in 1914, as against 57.1 per cent in 1909, was grown on

plantations controlled by the mill operators. The average cost per ton of the cane thus grown, as reported for 1914, was \$3.43, while that of cane purchased was \$3.68. Of the total cost of materials used the cane crushed represented 84 per cent in 1914, as compared with 80.8 per cent in 1909.

Table 13

MATERIALS. (Quantities, tons of 2,000 pounds.)	CANE SUGAR.	
	1914	1909
Total cost.....	\$15,958,218	\$21,294,844
Cane crushed:		
Tons.....	3,754,820	4,520,419
Cost.....	\$13,408,680	\$17,211,752
Grown on plantations controlled by mill owners—		
Tons.....	1,532,575	2,581,323
Cost.....	\$5,250,933	\$9,614,410
Purchased—		
Tons.....	2,186,477	1,906,951
Cost.....	\$7,969,882	\$7,481,604
Treated on shares or contract—		
Tons.....	55,768	32,145
Cost.....	\$178,874	\$115,738
Cost of fuel and rent of power.....	\$1,151,610	\$1,434,381
All other materials, cost.....	\$1,397,919	\$2,648,711

Products.—Table 14 gives, for 1914 and 1909, the quantities and values of the various products of the cane-sugar mills.

The average value per pound of the sugar reported was 3.6 cents in 1914, as against 4 cents in 1909. The average value per gallon of the molasses made, from which more or less of the sugar content had been extracted, was 9.8 cents in 1914 as against 11.6 cents in 1909. For the sirup, from which practically no sugar had been extracted, the average price per gallon was 25.2 cents during the two census years.

PRODUCTS. (Quantities, tons of 2,000 pounds.)	CANE SUGAR.		PRODUCTS. (Quantities, tons of 2,000 pounds.)	CANE SUGAR.	
	1914	1909		1914	1909
Total value.....	\$21,635,373	\$30,620,734	Sugar—Continued.		
Sugar:			Sugar other than brown—Continued.		
Tons.....	264,801	326,858	Clarified—		
Value.....	\$18,947,683	\$26,085,673	Tons.....	91,075	(1)
Brown or open kettle—			Value.....	\$6,742,266	
Tons.....	5,309	3,678	Raw—		
Value.....	\$361,410	\$301,386	Tons.....	114,823	(1)
Sugar other than brown—			Value.....	\$7,615,147	
Tons.....	269,492	323,180	Molasses:		
Value.....	\$18,586,273	\$26,794,287	Gallons.....	20,675,260	24,587,551
Refined—			Value.....	\$2,021,517	\$2,845,559
Tons.....	53,594	(1)	Sirup:		
Value.....	\$4,228,800		Gallons.....	2,420,633	1,449,860
			Value.....	\$609,696	\$365,632
			All other products, value.....	\$56,477	\$1,313,874

¹ Not reported separately.

² Products of establishments making no sugar included in "all other" in 1909.

THE SUGAR INDUSTRY.

11

CANE-SUGAR REFINING.

This branch of the industry comprises establishments which are engaged primarily in the refining of cane sugar. At censuses prior to that of 1909 the data for sugar refining were combined with those of the manufacture of cane sugar, for which reason the statistics for the earlier years are not comparable with those for 1909 or 1914. Following is a brief summary of the earlier statistics as to wage earners and value of products for establishments engaged in sugar refining and in the manufacture of sugar and molasses.

For 1849, under the heading "sugar refiners," 23 establishments were reported, with 1,656 wage earners and products valued at \$9,898,800; for 1859, 39, with 3,484 wage earners and products valued at \$42,143,234; for 1869, 59, with 4,597 wage earners and products valued at \$108,941,911; for 1879, 49, with 5,857 wage earners and products valued at \$155,484,915; and for 1889, 393, with 7,529 wage earners and products valued at \$123,118,259. In addition, for 1859, 2 establishments were classified under the heading "sugar

and molasses" and 2 under the heading "sugar evaporators," the former having 5 wage earners and products valued at \$2,280, and the latter, 27 wage earners and products valued at \$31,000; and for 1869, 713 establishments were reported under the heading "sugar and molasses, raw cane," employing 21,299 wage earners and having products valued at \$10,383,368.

For 1899, under the general classification "sugar and molasses, refining," there were reported 657 establishments, with products valued at \$239,711,011; and for 1904, 344 establishments, with products valued at \$277,285,449. These figures, however, are not strictly comparable with those for 1889 and former years. Two refineries reported for 1909 were idle in 1914, and one new establishment reported for 1914.

Table 15 gives detailed statistics relating to the United States as a whole, for the sugar-refining branch of the industry for 1914 and 1909. Separate figures for the states can not be given without disclosing the operations of individual establishments.

Table 15

	TOTAL FOR ALL ESTABLISHMENTS.		ESTABLISHMENTS WITH PRODUCTS VALUED AT—							
			Less than \$10,000,000.		\$10,000,000 to \$20,000,000.		\$20,000,000 or over.			
	1914	1909	1914	1909	1914	1909	1914	1909	1914	1909
Number of establishments.....	118	119	7	7	5	8	6	4		
Persons engaged in the industry.....	12,561	10,345	2,265	2,399	3,371	3,809	6,925	4,187		
Proprietors and firm members.....	8	6	5	6			3			
Salaried officers, superintendents, and managers.....	203	193	62	50	58	86	83	57		
Clerks and other subordinate salaried employees.....	1,097	747	188	175	212	273	697	299		
Male.....	1,011	695	177	158	187	259	647	278		
Female.....	86	52	11	17	25	14	50	21		
Wage earners—										
Average number.....	11,253	9,399	2,010	2,188	3,101	3,450	6,142	3,781		
Number 15th day of month—										
Maximum month and number.....	June 12,792	July 9,952	July 2,419	Sept. 2,395	June 3,485	July 3,916	June 6,897	Apr. 4,078		
Minimum month and number.....	Jan. 9,112	Jan. 7,935	Jan. 1,418	Jan. 1,696	Jan. 2,446	Feb. 3,017	Jan. 5,248	Jan. 3,161		
Wage earners Dec. 15 or most representative day.....	11,390	9,765	2,001	2,312	3,108	3,833	6,281	3,600		
16 years of age and over.....	11,362	9,719	1,989	2,290	3,108	3,836	6,265	3,593		
Male.....	10,890	9,434	1,945	2,230	2,992	3,738	5,923	3,466		
Female.....	502	285	44	60	116	98	342	127		
Under 16 years of age.....	28	46	12	22		17	16	7		
Male.....	20	42	4	22		17	16	3		
Female.....	8	4	8					4		
Capital.....	\$140,499,819	\$115,240,791	\$20,729,390	\$15,600,336	\$41,479,518	\$46,565,941	\$78,290,911	\$53,074,514		
Salaries and wages.....	\$10,325,597	\$7,275,126	\$1,942,919	\$1,324,221	\$2,962,550	\$2,995,909	\$5,420,128	\$2,943,999		
Officials.....	\$1,308,973	\$820,755	\$303,901	\$129,111	\$372,341	\$405,174	\$632,731	\$293,470		
Clerks, etc.....	\$1,193,247	\$833,400	\$223,106	\$175,984	\$257,206	\$331,724	\$712,935	\$325,602		
Wage earners.....	\$7,823,377	\$5,620,971	\$1,415,912	\$1,029,126	\$2,333,038	\$2,257,008	\$4,074,462	\$2,324,837		
Contract work.....	\$20,270	\$3,825	\$12,055	\$3,825	\$5,215					
Rent and taxes.....	\$943,068	\$570,401	\$377,616	\$102,866	\$195,871	\$350,521	\$369,631	\$117,014		
Rent of factory.....	\$276,066	\$198,550	\$261,346	\$23,550	\$3,400	\$175,000	\$12,060			
Taxes (including internal revenue).....	\$666,372	\$371,851	\$116,370	\$79,316	\$192,421	\$175,521	\$357,581			
Cost of materials.....	\$264,085,358	\$226,287,900	\$37,585,055	\$26,862,708	\$73,467,884	\$90,095,237	\$153,082,419	\$108,730,015		
Principal materials.....	\$260,100,198	\$222,421,589	\$36,825,214	\$26,410,414	\$72,387,292	\$89,498,345	\$150,887,692	\$107,515,830		
Fuel and rent of power.....	\$3,985,160	\$2,866,371	\$759,841	\$452,294	\$1,080,592	\$1,199,892	\$2,144,727	\$1,214,185		
Value of products.....	\$289,398,715	\$248,628,659	\$42,946,917	\$30,292,242	\$90,136,540	\$101,110,223	\$186,321,228	\$117,236,185		
Value added by manufacture.....	\$25,313,357	\$22,340,699	\$5,361,862	\$3,429,534	\$6,062,676	\$10,414,995	\$13,288,819	\$8,466,170		
Power:										
Primary horsepower.....	49,666	38,414	6,290	7,922	10,035	18,088	33,341	12,404		
Steam engines and turbines.....	45,407	37,453	5,389	7,863	7,100	17,941	32,018	12,380		
Internal-combustion engines.....	69	15	69	15						
Electric (rented).....	4,190	946	832	45	2,985	847	423	54		
Electric horsepower generated by establishments reporting.....	10,826	13,789	1,011	4,586	4,066	3,768	14,717	5,485		

¹ Includes for 1914: California, 2 establishments; Louisiana, 3; Massachusetts, 2; New Jersey, 2; New York, 5; Pennsylvania, 3; and Texas, 1. In 1909: California, 2 establishments; Louisiana, 5; Massachusetts, 2; New Jersey, 2; New York, 5; Pennsylvania, 2; and Texas, 1.

Table 1 presents a comparison of the major items shown in the above table with those for the other two branches of the industry, together with percentages of increase or decrease for the period 1909-1914.

The bulk of the raw sugar used by the refineries is imported from Cuba and in addition considerable

amounts are brought from Porto Rico, Hawaii, and the Philippines.

Except for a decrease of one in the number of establishments, Table 15 shows, for the sugar-refining branch of the industry, taken as a whole, considerable increases in all the times for which figures are given.

